



ChemTalk

PHYSICAL PROPERTIES

In this activity you examined a variety of physical properties of a mixture. In addition to the state and color of the mixture, you also observed the **texture** of the material. Texture is defined as the feel or appearance of a surface or substance. For example, if you were looking at a photograph, you may be interested in the texture of the surface of the paper used, or if you were looking at cloth, you might be interested in how the material is woven together. **Uniformity** describes how consistent a material is throughout. Does everything in the material seem to be evenly distributed? **Strength** determines how durable the material is. How well the material withstands the application of a force establishes how strong it is. **Elasticity** determines how well the material will resist deformation and return to its normal size or shape after a force has been applied to it. **Bounce** refers to the material's ability to return to its original position when it is dropped from a given height. Another way to think about bounce is to consider how much it behaves like a ball. **Malleability** determines how easy it is to roll or hammer out the material without breaking it apart. Can the material be reshaped without breaking it apart? Lead is an example of a metal that can easily be shaped into other forms without breaking. Brittle objects shatter easily.



Chem Words

texture: the characteristics of the surface of a material, like how smooth, rough, or coarse it is.

uniformity: the property of how consistent a material is throughout.

strength: the property of how well a material withstands the application of a force.

elasticity: the property of a material to resist deformation and return to its normal size or shape after a force has been applied to it.

bounce: the ability of an object to rebound to its original position when dropped from a given height.

malleability: the property of a material to be able to be hammered into various shapes without breaking.

COMPOSITE MATERIALS

The properties of a mixture can be changed by adding different materials. The modeling dough you made in this activity was an **emulsion**. When you added one of the other materials, you made a **composite**. Composites are heterogeneous mixtures that use the characteristics of the components to make useful substances. Another example of a composite is paper maché.



The composite industry has been growing at a very rapid pace. Think about it. Composites are used as the skin on jets, rotor blades of a helicopter, bulletproof clothing for law enforcement officers, and special armor for tanks. Buildings, cars, boats, trains, and planes all take advantage of different types of composites. If you were trying to define what a composite is, you would probably say that it is a solid that consists of two or more materials. It may be the process by which fibers are embedded within another material. Usually, this will lead to a stronger material and provide the best qualities of both materials. Composites not only help make stronger and lighter materials but they also help in extending the life of materials. Composites are used for materials that cover electrical cables and protect them from chemicals.

A major drawback to composites is the initial cost of research and the use of special raw materials in fabricating the composite. However, overall composites are materials of the future and their manufacture could be a great career choice.

Chem Words

emulsion: a colloid or colloidal dispersion of one liquid suspended in another.

composite: a solid heterogeneous mixture of two or more substances that make use of the properties of each component.

Checking Up

- Two pieces of cloth have the same color and texture. Name another property of cloth that you might use to distinguish between the two materials.
- Provide a situation in which each of the following properties of a material might be important:
 - elasticity,
 - uniformity,
 - strength,
 - bounce.
- What is a composite material?
- Give an advantage and a disadvantage of using a composite material.